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Straut

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[54] **BEARING PUSHER**

[76] Inventor: **Nelson F. Straut**, 515 N. Hairston Rd., Stone Mountain, Ga. 30083

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[51] **Int. Cl.**[6] **B23P 19/04**

[52] **U.S. Cl.** **29/256**

[58] **Field of Search** 29/256, 263, 266, 29/258, 239, 238, 237, 235

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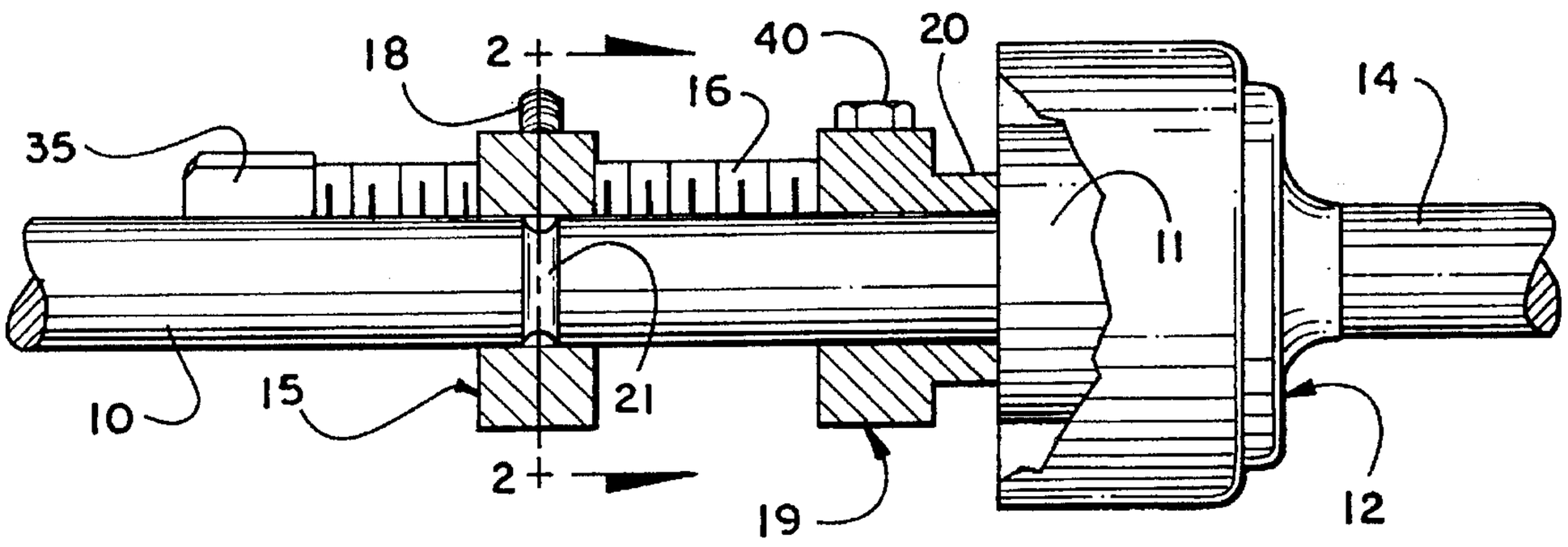
Primary Examiner—Robert C. Watson
Attorney, Agent, or Firm—James B. Middleton

[57] **ABSTRACT**

A bearing pusher to remove a bearing from a shaft has a split anchor block that can be placed over the shaft at any point desired. The split block is then fixed together; and, a plurality of set screws engage the shaft or, preferably, enter a groove in the shaft to hold the anchor block in place. A split pusher block can be placed over the shaft between the anchor block and the bearing, and the parts fixed together. Screws pass through threaded holes in the anchor block and engage sockets in the pusher block, so that rotation of the screws causes motion of the pusher block longitudinally along the shaft.

4 Claims, 1 Drawing Sheet



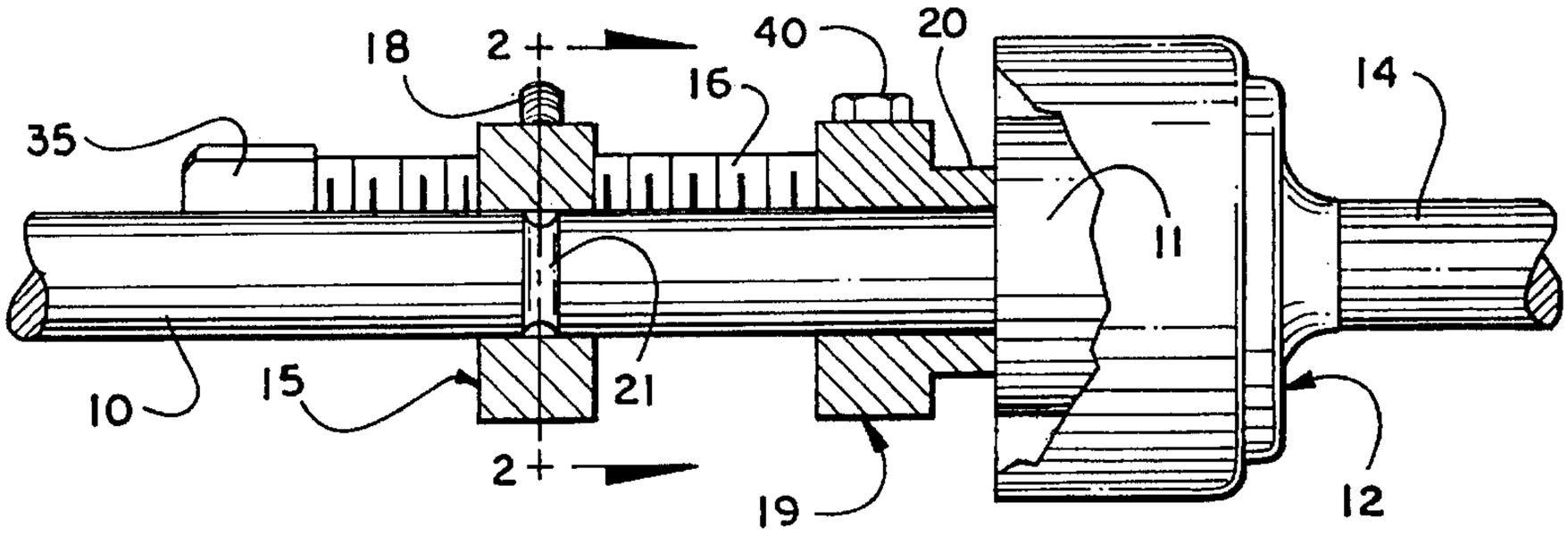


Fig_1

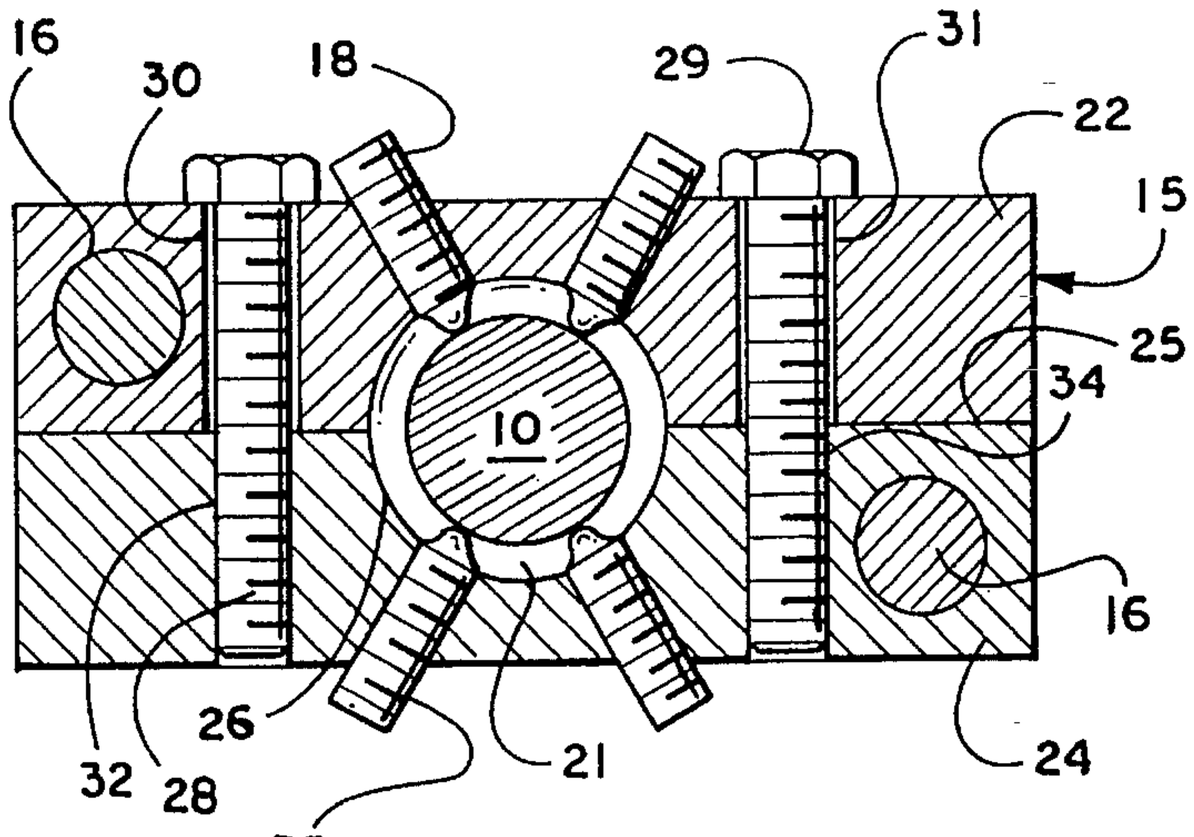


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Fig_2

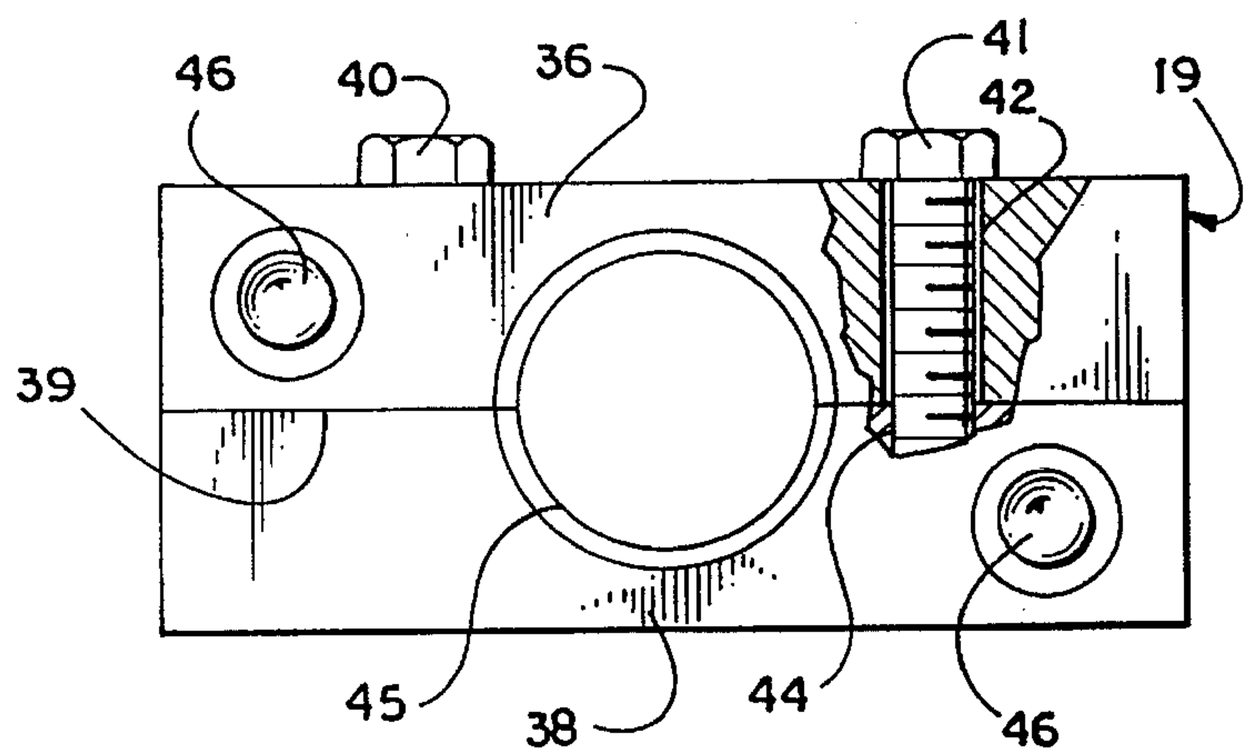

Fig_4

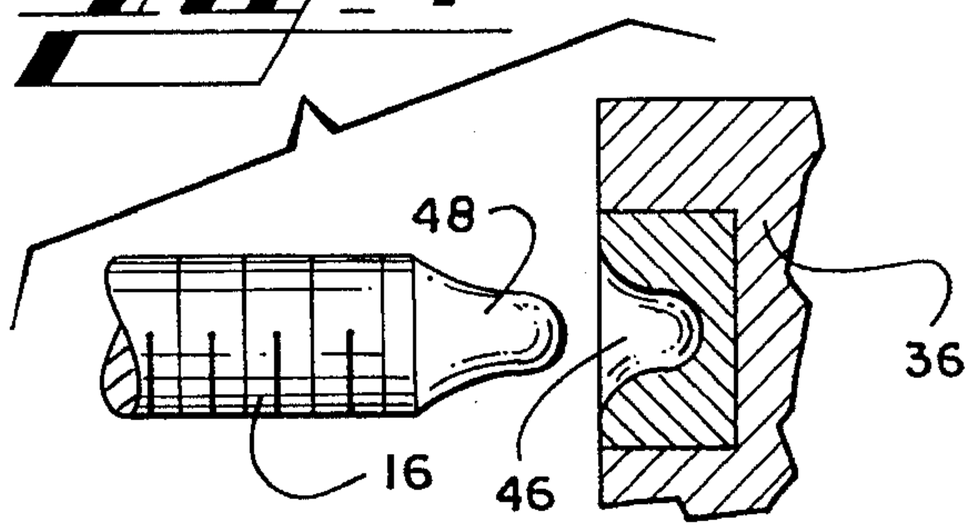

Fig_3

BEARING PUSHER

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to bearing removal means, and is more particularly concerned with a shaft-mounted apparatus for pushing a bearing or the like off the shaft.

2. Discussion of the Prior Art

In removing a bearing or the like from a shaft, one of the most common techniques is to utilize a bearing puller wherein a spindle engages the end of the shaft, and hooked fingers engage the bearing. A screw then urges the fingers rearwardly to pull the bearing off the shaft.

There are some bearings in which the end of the shaft is not accessible for use of the conventional bearing puller. One such bearing is a front wheel bearing of a front-wheel drive automobile. Such a bearing is splined to a shaft, and a hub surrounds the bearing and mounts the stub shaft to carry a wheel. Since the end of the shaft mounting the bearing is not accessible, the conventional bearing puller is not usable. The conventional method for removing such bearings is to drive the bearing off the shaft with hammer blows. It is well known that one ought not to hammer on a bearing; but, there has been no other means devised for removal of the bearings. Thus, even manufacturer-trained mechanics hammer on the bearing to remove it from the shaft.

SUMMARY OF THE INVENTION

The present invention provides a shaft-mounted pusher for gently urging a bearing off a shaft. An anchor block is split to be placeable on a shaft at any position desired, and a pusher block is also split to be placeable on a shaft adjacent to the anchor block. The pusher block is placed adjacent to the bearing to be removed, and pushing members threadedly carried by the anchor block engage the pusher block and move it to move the bearing.

The anchor block includes means for locking the anchor block with respect to the shaft, while the pusher block is freely movable along the shaft. The pusher block includes a pusher ring adapted to engage the bearing being removed. The exact design of the pusher ring will be varied as needed so the pusher ring will not engage the actual bearing race, but will engage a sturdy portion of the bearing that can withstand the forces involved.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features and advantages of the present invention will become apparent from consideration of the following specification when taken in conjunction with the accompanying drawings in which:

FIG. **1** is a side elevational view showing a shaft having a bearing thereon, and showing a bearing pusher in cross-section mounted on the shaft in position to remove the bearing;

FIG. **2** is a cross-sectional view taken along the line **2—2** in FIG. **1**;

FIG. **3** is an elevational view, partially in cross-section, of the pusher block shown in FIG. **1**; and,

FIG. **4** is an enlarged, fragmentary view showing the pushing member and its bearing member on the pusher block.

DETAILED DESCRIPTION OF THE EMBODIMENT

Referring now more particularly to the drawings, and to that embodiment of the invention here chosen by way of illustration, FIG. **1** shows a shaft **10** having a bearing **11** thereon. The specific bearing **11** here shown is the bearing for a front wheel of a front-wheel-drive vehicle. It will therefore be seen that there is an apparatus **12** enclosing the bearing **11**, the apparatus **12** including a stub shaft **14** for receiving a wheel. Because of the apparatus **12**, it will be observed that the end of the shaft **10** is not available for use of a conventional bearing or gear puller. Conventionally, therefore, the bearing **11** is removed by hammering on the bearing **11** to drive it off the shaft **10**.

The device of the present invention is shown in place in FIG. **1** for urging the bearing **11** off the shaft **10**. It will be seen that there is an anchor block **15** fixed to the shaft **10**, and carrying at least one pushing member **16**. There is a locking means **18** for selectively fixing the anchor block **15** to the shaft **10**. Adjacent to the anchor block **15** there is a pusher block **19**. The pusher block **19** is freely movable along the shaft **10**, and includes a pushing ring **20**. Those skilled in the art will understand that the pushing ring **20** will engage the bearing **11** in a manner not to damage the bearings. The pushing ring **20** will preferably engage the rigid portion of the bearing that receives the shaft **10**, so the force to remove the bearing will be applied directly rather than through the bearing races or the like.

It should be noticed that the shaft **10** defines a groove **21** circumferentially thereof. Those skilled in the art will understand that a rubber boot typically covers the area pictured, and the groove **21** receives one end of the boot so the boot is retained in position. In the embodiment of the invention here shown, the groove **21** is used in conjunction with the locking means **18** to hold the anchor block **15** is the desired position without damaging the shaft **10**. This construction will be discussed in more detail below.

Attention is now directed to FIG. **2** of the drawings. In this figure it can be seen that the anchor block **15** comprises an upper member **22** and a lower member **24**. The parting line **25** between the upper and lower members **22** and **24** is preferably along a diameter of the opening **26** for receiving the shaft **10**. To hold the upper and lower members together, then, there are two screws **28** and **29**. The screws **28** and **29** pass through openings **30** and **31** in the upper member **22**, and engage threaded holes **32** and **34** in the lower member **24**.

As is shown in FIG. **1**, the pushing members **16** comprise threaded members having a head **35** for engagement with a wrench or the like. The pushing members **16** are threadedly engaged with the anchor block **15**, one being on one side, in the upper member **22**, and the other being on the opposite side, in the lower member. Rotation of the heads **35** will therefore cause longitudinal movement of the pushing members **16**.

The locking means **18** may take several different forms. It is well known that one might use a conventional cup-pointed set screw or the like to lock the anchor member **15** to the shaft **10**. The locking means **18** here illustrated is the preferred embodiment because a natural feature of the shaft **10** is used for securely locking the anchor block **15** to the shaft **10** without marring the surface of the shaft. Thus, the locking means **18** includes four ball-pointed screws **35**. The four screws **35** are spaced circumferentially of the opening **26** in an effort to obtain uniform holding of the block **15** and to prevent canting of the block. Those skilled in the art will

understand that a different number of screws **35** can be used. As few as one screw will work quite well, and four provides good balance. Virtually any number can be used if properly spaced for adequate holding of the block.

With the above description in mind it will be understood that the screws **28** and **29** can be removed from the anchor block **15**, and the upper and lower members **22** and **24** can be separated. The two halves can then be placed on opposite sides of the shaft **10**, and the members reassembled using the screws **28** and **29**. The opening **26** will be of such a size that the upper and lower members **22** and **24** can be pulled together snugly with the shaft **10** received within the opening **26**.

With the anchor block **15** properly placed around the groove **21**, the screws **35** will be rotated to move inwardly until the ball points are engaged within the groove **21**. Of course, if the shaft **10** does not have the groove **21**, a pointed, or cup pointed set screw will be used to hold firmly to the shaft.

Attention is now directed to FIG. **3** for a full understanding of the pusher block **19**. It will be seen that the pusher block also includes an upper member **36** and a lower member **38** which separate along a line **39**. The two members are held together by screws **40** and **41**. As in the anchor block, the screws **40** and **41** pass through holes **42** in the upper member **36** and engage threaded holes **44** in the lower member **38**. The central opening **45** is preferably sized so that, with the upper and lower members **36** and **38** held snugly together, the pusher block **19** will still slide reasonably easily along the shaft **10**.

From the above discussion it will be understood that the pushing members **16** engage the pusher block **19** to urge it along the shaft. In view of the forces involved, it is preferable to have sockets in the pusher block **19** to prevent lateral movement of the pushing members **16**. Thus, the pusher block **19** includes sockets **46** located to be aligned with the pushing members **16**.

FIG. **4** illustrates the preferred form of the tip of the pushing member **16** and the socket **46**. The socket **46** is formed of a bearing material, and may be a separate insert of material. The pushing member **16** is shaped to be easily received within the socket **46**, and to rotate therein. This arrangement prevents lateral motion, or walking of the pushing member during use.

It will now be clearly understood that the anchor block **15** will be fixed to the shaft **10**, and the pusher block **19** placed on the shaft between the anchor block **15** and the bearing **11**.

Rotation of the pushing members **16** will cause them to engage the sockets **46** on the pusher block **19**. Continued rotation, then, will urge the pusher block against the bearing **11**. Further rotation of the pushing members **16** will urge the bearing off the end of the shaft **10**.

It will of course be understood by those skilled in the art that the particular embodiment of the invention here presented is by way of illustration only, and is meant to be in no way restrictive; therefore, numerous changes and modifications may be made, and the full use of equivalents resorted to, without departing from the spirit or scope of the invention as outlined in the appended claims.

I claim:

1. A bearing pusher for urging a bearing off a shaft, said bearing pusher comprising an anchor block defining an opening therein for receiving said shaft therethrough, locking means for temporarily fixing said anchor block to said shaft adjacent to said bearing, a pusher block defining an opening therein for receiving said shaft therethrough, said pusher block being positioned between said anchor block and said bearing, and pushing means threadedly engaging said anchor block and in contact with said pusher block for urging said pusher block towards said bearing, said anchor block further including an upper member and a lower member defining a parting line therebetween, said parting line being along a diameter of said opening in said anchor block, and means for securing said upper member and said lower member together, and, wherein said shaft defines a circumferential groove, said anchor block being positioned at said groove, and said locking means comprising at least one screw, a tip on said screw being receivable within said groove.

2. A bearing pusher as claimed in claim **1**, said pusher block further including an upper member and a lower member defining a parting line therebetween, said parting line being along a diameter of said opening in said pusher block, and means for securing said upper member and said lower member together.

3. A bearing pusher as claimed in claim **2**, said pusher block including a pusher ring carried by said pusher block for engaging said bearing.

4. A bearing pusher as claimed in claim **3**, said pusher block defining sockets thereon, said sockets being adapted to receive the extending ends of said pushing means.

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